



## **NUCLEAR REGULATORY COMMISSION**

**[Docket Nos. 72-29, 50-277, and 50-278; NRC-2025-0033]**

**Constellation Energy Generation, LLC; Peach Bottom Atomic Power Station Units 2 and 3; Independent Spent Fuel Storage Installation; Exemption**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Notice; issuance.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) issued an exemption to Constellation Energy Generation, LLC, permitting Peach Bottom Atomic Power Station (PB) Units 2 and 3 to use the Holtec HI-STORM Flood/Wind (FW) Multi-Purpose Canister (MPC) Storage System, including the use of the HI-TRAC VW transfer cask during loading and transport operations, at the PB independent spent fuel storage installation, for seven 89 multi-purpose canisters, in a near-term loading campaign beginning in June 2025, where the terms, conditions, and specifications in Certificate of Compliance No. 1032, Amendment No. 1, Revision No. 1, are not met.

**DATES:** The exemption was issued on March 6, 2025.

**ADDRESSES:** Please refer to Docket ID **NRC-2025-0033** when contacting the NRC about the availability of information regarding this document. You may obtain publicly available information related to this document using any of the following methods:

- **Federal Rulemaking Website:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2025-0033**. Address questions about Docket IDs in Regulations.gov to Bridget Curran; telephone: 301-415-1003; email: [Bridget.Curran@nrc.gov](mailto:Bridget.Curran@nrc.gov). For technical questions, contact the individual listed in the “For Further Information Contact” section of this document.

- **NRC’s Agencywide Documents Access and Management System**

**(ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please

contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to [PDR.Resource@nrc.gov](mailto:PDR.Resource@nrc.gov). The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in this document.

- **NRC's PDR:** The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to [PDR.Resource@nrc.gov](mailto:PDR.Resource@nrc.gov) or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Yen-Ju Chen, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555; telephone: 301-415-1018; email: [Yen-Ju.Chen@nrc.gov](mailto:Yen-Ju.Chen@nrc.gov).

**SUPPLEMENTARY INFORMATION:** The text of the exemption is attached.

Dated: March 19, 2025.

For the Nuclear Regulatory Commission.

**Yaira Diaz-Sanabria,**  
*Chief,*  
*Storage and Transportation Licensing Branch,*  
*Division of Fuel Management,*  
*Office of Nuclear Material Safety, and Safeguards.*

**Attachment – Exemption**

**NUCLEAR REGULATORY COMMISSION**

**Docket Nos. 72-29, 50-277, and 50-278**

**Constellation Energy Generation, LLC**

**Peach Bottom Atomic Power Station Units 2 and 3**

**Independent Spent Fuel Storage Installation;**

**I. Background**

Constellation Energy Generation, LLC (CEG) is the holder of renewed facility operating license Nos. DPR-44 and DPR-56, which authorize operation of the Peach Bottom Atomic Power Station (PB) Units 2 and 3 in Delta, Pennsylvania, under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities.” The licenses provide, among other things, that the facility is subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (NRC) now or hereafter in effect.

Consistent with 10 CFR part 72, subpart K, “General License for Storage of Spent Fuel at Power Reactor Sites,” a general license is issued for the storage of spent fuel in an independent spent fuel storage installation (ISFSI) at power reactor sites to persons authorized to possess or operate nuclear power reactors under 10 CFR part 50. CEG is authorized to operate nuclear power reactors under 10 CFR part 50 and holds a 10 CFR part 72 general license for storage of spent fuel at the PB ISFSI. Under the terms of the general license, CEG stores spent fuel at its PB ISFSI using the HI-STORM Flood/Wind (FW) Multi-Purpose Canister (MPC) Storage System in accordance with Certificate of Compliance (CoC) No. 1032, Amendment No. 1, Revision No. 1.

**II. Request/Action**

By a letter dated January 24, 2025 (Agencywide Documents Access and Management System (ADAMS) Accession Number No. ML25024A148), as supplemented on February 4, 2025 (ML25036A335), CEG requested an exemption from the requirements of 10 CFR §§ 72.212(a)(2), 72.212(b)(3), 72.212(b)(5)(i),

72.212(b)(11), and 72.214 that require PB to comply with the terms, conditions, and specifications of CoC No. 1032, Amendment No. 1, Revision No. 1 (ML15152A358). If approved, CEG's exemption request would accordingly allow PB to load seven MPC-89 at the PB ISFSI site in a near-term loading campaign beginning in June 2025, in the HI-STORM FW MPC system, including the use of the HI-TRAC VW transfer cask (HI-TRAC) during loading and transport operations, where the terms, conditions, and specifications in CoC No. 1032, Amendment No. 1, Revision No. 1 are not met.

Before using a CoC, general licensees are required to perform a site-specific evaluation to establish that, once loaded with spent fuel, the cask will conform to the terms, conditions, and specifications of the CoC, including following the NRC-approved final safety analysis report (FSAR) methodology. CEG currently uses the HI-STORM FW MPC Storage System under CoC No. 1032, Amendment No. 1, Revision No. 1, for dry storage of spent nuclear fuel in MPC-89 at the PB ISFSI. The HI-STORM FW MPC Storage System CoC provides the requirements, conditions, and operating limits necessary for use of the system to store spent fuel. One of the operating limits established in the CoC involves potential tornado-generated missile impacts. The HI-STORM FW FSAR table 2.2.5 evaluates a generic set of tornado-generated missile impacts (ML24327A229). CEG discovered that PB's site-specific analysis performed to demonstrate protection of the loaded MPC-89, while in the HI-TRAC, against tornado-generated missiles was not performed consistent with the NRC-approved method of evaluation in the FSAR. Contrary to CEG's site specific analysis, the NRC-approved evaluation in the FSAR does not take credit for the missile resistance offered by the HI-TRAC water jacket shell, and assumes that the small and intermediate missiles will penetrate the water jacket shell with no energy loss.

Therefore, CEG requests this exemption to allow it to conduct the planned loading and transport operations of the seven MPC-89 in the HI-STORM FW MPC Storage System at PB ISFSI beginning in June 2025, even though, because of the

different tornado-generated missile analysis of the HI-TRAC in PB's site specific review, the terms, conditions, and specifications of the CoC will not be met.

### **III. Discussion**

Pursuant to 10 CFR 72.7, "Specific exemptions," the Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations of 10 CFR part 72 as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

#### **A. The Exemption is Authorized by Law**

This exemption would allow CEG to use the HI-STORM FW MPC Storage System, including the use of the HI-TRAC during loading and transport operations, for seven MPC-89 at its PB ISFSI, beginning in June 2025, where the terms, conditions, and specifications in CoC No. 1032, Amendment No. 1, Revision No. 1, are not met. CEG is requesting an exemption from the provisions in 10 CFR part 72 that require the licensee to comply with the terms, conditions, and specifications of the CoC for the approved cask model it uses. Section 72.7 allows the NRC to grant exemptions from the requirements of 10 CFR part 72. This authority to grant exemptions is consistent with the Atomic Energy Act of 1954, as amended, and is not otherwise inconsistent with the NRC's regulations or other applicable laws. Additionally, no other law prohibits the activities that would be authorized by the exemption. Therefore, the NRC concludes that there is no statutory prohibition on the issuance of the requested exemption, and the NRC is authorized to grant the exemption by law.

#### **B. The Exemption Will Not Endanger Life or Property or the Common Defense and Security**

CEG is requesting an exemption to use the HI-STORM FW MPC Storage System, including the use of the HI-TRAC during loading and transport operations for seven MPC-89 at the PB ISFSI, beginning in June 2025, where the terms, conditions, and specifications in CoC No. 1032, Amendment No. 1, Revision No. 1, are not met. In

support of its exemption request, CEG asserts that issuance of the exemption would not endanger life or property because the evaluation of PB's postulated tornado-generated missiles demonstrates that all FSAR acceptance criteria are met. According to CEG, the site-specific analysis follows the same mathematical approach as the generic approach in the FSAR but takes credit for the additional resistance provided by the HI-TRAC water jacket shell. Additionally, CEG notes that the water jacket shell is an Important-to-Safety (ITS) component and meets all the criteria as analyzed. Therefore, CEG contends the site-specific analysis, although different from the FSAR methodology, demonstrates that the loading and transport operations of the system using the HI-TRAC provides adequate protection against PB's design basis tornado-generated missiles. As such, according to CEG, the proposed exemption does not endanger life or property or the common defense and security.

The NRC staff reviewed the requested exemption and determined that the request does not change the fundamental design, components, or safety features of the storage system. The NRC staff evaluated the applicable potential safety impacts of granting the exemption to assess the potential for any danger to life or property or the common defense and security. Specifically, the NRC staff reviewed the applicant's structural, confinement, thermal, criticality, shielding, and radiation protection evaluations for the proposed exemption.

*Structural and Confinement Review for the Requested Exemption:* The staff noted that this exemption does not involve any change to the physical design or construction of the HI-STORM FW overpack, HI-TRAC, or MPC-89, nor to any operating procedures. Instead, the exemption is to allow the use of the CoC system despite the different methodology used by PB regarding the tornado-generated missile impact analysis than that approved by the NRC and reflected in the CoC FSAR. Therefore, the staff's structural review focused on the analysis and methodology followed to demonstrate that the design of the MPC-89 and the HI-TRAC can withstand the governing PB site-specific tornado-generated missile impact without impairing their

capability to perform their intended functions. The MPC and the HI-TRAC are deemed to perform their intended design functions if the following performance objectives, as described in HI-STORM FW FSAR section 3.1.2 (ML24327A229), can be satisfied:

i) The postulated tornado generated missiles do not compromise the integrity of the MPC confinement boundary while the MPC is contained within the HI-TRAC.

ii) No geometry changes occur under the postulated tornado-generated missiles impact during handling conditions that may preclude ready retrievability of the contained MPC.

iii) The radiation shielding remains properly positioned under all applicable handling service conditions for the HI-TRAC.

In general, the above performance objectives are deemed to be satisfied for the MPC and the HI-TRAC if (1) the missile does not penetrate the inner shell of the HI-TRAC, MPC or MPC lid, and does not breach the confinement boundary, (2) the stresses (stress intensities or strains, as applicable) calculated by the appropriate structural analyses are less than the allowable defined in FSAR subsection 3.1.2.3, and (3) the geometry change in the HI-TRAC, if any, after any event of structural consequence to the transfer cask, does not preclude ready retrievability of the contained MPC.

The HI-TRAC body consists of two main layers: a water jacket layer and a lead shield layer. Each layer is contained within different steel shells: the water jacket shell (outermost shell of HI-TRAC), the outer shell of the lead shield layer (between the water jacket layer and a lead shield layer), and the inner shell (innermost shell of the lead shield layer and the HI-TRAC). The proprietary Holtec Report HI-2135869, "Site-Specific Tornado Missile Analysis for HI-STORM FW System," Revision No. 9, generically addresses the HI-TRAC structural responses due to bounding site-specific small and intermediate tornado-generated missile strikes, except for the governing tornado-generated missile for PB, which is a 4-inch x 12-inch x 12-foot-long wooden plank with an impact velocity of 300 miles per hour (mph). In support of this exemption request,

Holtec's "HI-STORM FW Calculation Package to Support Exemptions" (PB site-specific analysis, ML25021A244) further analyzed the governing site-specific wooden plank missile using the same energy balance approach and assumptions relating to the missile behavior and kinetic energy as other evaluated tornado-generated missiles, with the exception of the credit given in the analysis for the resistance provided by the HI-TRAC water jacket shell. Based on this analysis, CEG concluded that the HI-TRAC inner shell is not penetrated and is sufficient to absorb the remaining kinetic energy of the wooden plank. Therefore, CEG concludes that the site-specific governing tornado-generated missile does not penetrate the MPC-89 confinement boundary, and no significant deformation of the HI-TRAC is expected that would prevent the MPC-89 from being retrieved or maintaining shielding effectiveness.

The staff reviewed the sizes, mass, and velocities of the site-specific tornado-generated missiles analyzed in the PB site-specific analysis and verified that the analyzed tornado-generated missiles bound the design basis tornado-generated missile spectrum specified in section C.2.4 of the PB updated final safety analysis report, Appendix C (ML23173A057). The staff's independent analysis of the missile penetration by the wooden plank concluded that a greater margin of safety is available for the inner shell penetration than the one calculated in the PB site-specific analysis. Furthermore, based on the review of the PB site-specific analysis, the staff finds that the missile penetration depth by the wooden plank in the MPC lid remains less than the minimum thickness of the MPC closure lid. Additionally, the calculated global stress intensities for the HI-TRAC shell due to the missile strike satisfy American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NF, Level D limits, as specified in the HI-STORM FW FSAR section 3.1.2.3. Therefore, in the event of a tornado-generated missile impact from the wooden plank analyzed, damage to the cask or canister that compromise confinement boundary, global plastic deformation in the cask shell, or ovaling of the cask inner cavity, is not anticipated, and will not affect the overall shielding effectiveness of the cask and the retrievability of the

MPC. The staff also noted that the analysis results are conservative since they assume that the wooden plank is rigid, and no kinetic energy dissipation is being credited due to deformation of the wooden plank when it strikes the HI-TRAC at high velocity.

Based on the staff's review of the analysis provided for the exemption request, the staff finds the proposed methodology used for the PB site-specific missile penetration analysis acceptable and concludes that the site-specific analysis demonstrates that the MPC and HI-TRAC can withstand the governing site-specific tornado-generated missile impact without compromising their ability to perform their intended safety functions at PB.

*Thermal Review for the Requested Exemption:* The thermal consequences of a complete loss of water due to rupture of the HI-TRAC water jacket from a tornado-generated missile has been analyzed in FSAR sections 4.6 and 12.2.6.2 (ML24327A229). It demonstrates that the consequences are within the short-term fuel cladding and material temperature limits. The revised analysis with credit for the HI-TRAC water jacket shell demonstrates that the FSAR acceptance criteria continue to be met, and a complete loss of water continues to be bounding for thermal evaluation. Therefore, no further thermal evaluation is required to support this exemption request.

*Criticality and Shielding Review for the Requested Exemption:* A complete loss of water due to rupture of the HI-TRAC water jacket from a tornado-generated missile has been analyzed for shielding and no effect on criticality control features as stated in FSAR section 12.2.6.2 (ML24327A229). The revised analysis with credit for the HI-TRAC water jacket shell demonstrates that the FSAR acceptance criteria continue to be met, and a complete loss of water continues to be bounding for the shielding evaluation. Therefore, no further criticality and shielding review is required to support this exemption request.

*Radiation Protection Review for the Requested Exemption:* There is no degradation in confinement capabilities of the MPC when inside of the HI-TRAC. The local dose rates of a complete loss of water due to rupture of the HI-TRAC water jacket from a tornado-generated missile has been analyzed in FSAR chapter 5

(ML24327A229). The revised analysis with credit for the HI-TRAC water jacket shell demonstrates that the FSAR acceptance criteria continue to be met, and a complete loss of water continues to be bounding for radiation protection. The necessary compensatory measures continue to be valid. Therefore, no further radiation protection review is required to support this exemption request.

*Conclusion:* Based on staff's analysis of the structural and confinement review, and the otherwise bounding nature of the FSAR's analysis in other areas, the NRC staff has concluded that under the requested exemption, the storage system will continue to meet the safety requirements of 10 CFR part 72 and the offsite dose limits of 10 CFR part 20 and, therefore, will not endanger life or property or the common defense and security.

**C. The Exemption is Otherwise in the Public Interest**

The proposed exemption would allow CEG to use the HI-STORM FW MPC Storage System, including the use of the HI-TRAC solely during loading and transport operations for seven MPC-89 at PB ISFSI, beginning in June 2025, even though PB's tornado-generated missile analysis of HI-TRAC, which takes credit for the water jacket shell, is not part of the NRC-approved CoC No. 1032, Amendment No. 1, Revision No. 1. According to CEG, the exemption is in the public interest because being unable to load fuel into dry storage in the future loading campaign would impact CEG's ability to offload fuel from the PB reactor, consequently impacting continued safe reactor operation.

CEG states that not being able to use the HI-STORM FW MPC Storage System, including the use of the HI-TRAC during loading and transport operations for seven MPC-89 at the PB ISFSI in the June 2025 loading campaign, would impact its ability to effectively manage the margin to full core discharge capacity (FCDC) in the PB Units 2 and 3 spent fuel pools (SFP). The low FCDC margin makes it difficult to stage a complete reload batch of fuel in the SFPs in preparation for outages and presents a potential reactivity management risk to fuel handling operations during pre- and post-

outage activities. In addition, according to CEG, a crowded spent fuel pool would challenge the decay heat removal demand of the pool and increase the likelihood of a loss of fuel pool cooling event and a fuel handling accident. Furthermore, CEG contends that PB planned the cask loading campaign years in advance based on availability of the specialized work force and equipment that is shared throughout the CEG fleet. These specialty resources support competing activities and priorities, including fuel pool cleanouts and refueling outages. Therefore, CEG asserts that the available windows to complete the cask loading campaigns are limited, and any delays would have a cascading impact on other scheduled specialized activities.

For the reasons described by CEG in the exemption request, the NRC staff agree that it is in the public interest to grant the exemption. If the exemption is not granted, in order to comply with the CoC, CEG would have to keep spent fuel in the spent fuel pool if it is not permitted to use the HI-TRAC during loading and transport operations for seven MPC-89 at the PB ISFSI for the loading campaign beginning in June 2025, thus impacting PB's ability to effectively manage the FCDC margin. Moreover, should spent fuel pool capacity be reached, the ability to refuel the operating reactor unit is challenged, thus potentially impacting continued reactor operations.

Therefore, the staff concludes that approving the exemption is in the public interest.

#### Environmental Consideration

The NRC staff also considered whether there would be any significant environmental impacts associated with the exemption. For this proposed action, the NRC staff performed an environmental assessment pursuant to 10 CFR 51.30. The environmental assessment concluded that the proposed action would not significantly impact the quality of the human environment. The NRC staff concluded that the proposed action would not result in any changes in the types or amounts of any radiological or non-radiological effluents that may be released offsite, and there would be no significant increase in occupational or public radiation exposure because of the

proposed action. The environmental assessment and the finding of no significant impact was published on March 6, 2025 (90 FR 11440).

#### **IV. Conclusion**

Based on these considerations, the NRC has determined that, pursuant to 10 CFR 72.7, the exemption is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest. Therefore, the NRC grants CEG an exemption from the requirements of 10 CFR 72.212(a)(2), 72.212(b)(3), 72.212(b)(5)(i), 72.212(b)(11), and 72.214 solely with respect to the planned loading and transport operations for seven MPC-89 at PB ISFSI for the loading campaign beginning in June 2025.

This exemption is effective upon issuance.

Dated: March 6, 2025.

For the Nuclear Regulatory Commission.

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Thomas Boyce, Acting Chief,  
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and Safeguards.

[FR Doc. 2025-04921 Filed: 3/21/2025 8:45 am; Publication Date: 3/24/2025]